UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MEMORANDUM

DATE: November 21, 2002

SUBJECT: Review of the Supplemental Site Investigations/Site Characterization Report, , Himco Dump Superfund Site, Elkhart, Indiana

FROM: Pat Van Leeuwen
Toxicologist/Superfund

TO: Gwen Massenburg
Remedial Project Manager

I have a few comments on my review of the Draft Final Supplemental Site Investigations/Site Characterization Report for the Himco Dump Superfund Site, prepared by the USACE and dated September 2002, that can not be submitted as a redline. The changes required in these sections are too extensive for a quick redline and require more work. I have also included approval comments on the remaining chapters so that you will know that my previous comments have been addressed.

My remaining comments on this draft are provided below.

7.0 Contaminant Fate and Transport

1) Page 7-10, Sections 7.2.2.1.1 and 7.2.2.1.3 (para.2):

I had previously commented on the discussion of the redox changes on the valence state of chromium, because these two section were inconsistent. They are now consistent....but apparently wrong. This discussion should be reviewed. The ATSDR Toxicological Profile for Chromium, September 2000, page 295 states:

> "Chromium speciation in groundwater depends on the redox potential and pH conditions in the aquifer. Chromium (VI) predominates under highly oxidizing conditions; whereas chromium (III) predominates under reducing conditions. Oxidizing conditions are

generally found in shallow aquifers, and reducing conditions generally exist in deeper groundwaters. In seawater, chromium (VI) is generally stable. In natural groundwater, the pH is typically 6-8, and CrO_4^{-2} is the predominant species of chromium in the hexavalent oxidation state, while $Cr(OH)_2^{+1}$ will be the dominant species in the trivalent oxidation state. This species and other chromium (III) species will predominant in more acidic pH; $Cr(OH)_3$ and $Cr(OH)_4^{-1}$ predominate in more alkaline waters (Calder 1988)."

This discussion appears to be in direct conflict with the text statements in the noted sections. It appears that either the ATSDR Tox Profile is incorrect or the Himco report text is incorrect. The latter needs to be correct; this is a public document.

2) Page 7-15, para. 4, last sentence:

The revised sentences in this paragraph are more readable; however, the last sentence is missing a subject noun. I suggest "location; the result suggests" as a simple fix.

3) Page 7-16, para. 3, 1st sentence:

Change "the 1980 data shows" to "The 1980 data show".

4) Page 7-16, para. 4, 1st sentence:

Change "the 1988 data shows" to "The 1988 data show".

5) Page 7-16, para. 5, 1st sentence:

Change "the 2000 data shows" to "The 2000 data show".

12.0 References

1) Overall:

The references are still in a disgraceful state.....they are neither consistent nor complete. This is too extensive a project for me to handle as a redline. However, I am not certain that EPA wants to pay to have the references prepared correctly; the state of the references primarily reflects on the ability of USACE to prepare a correct and coherent report, and if they want to let this document go out in this form perhaps that should be their decision.

The problems include, but are not limited to, inconsistent documentation of the references.....inconsistent placement of periods, commas, dates, entry information, etc; missing information, such as publisher's addresses.....including EPA office, location and document number; wrong use of underlining (or italics) in entries; inappropriate reporting of pages...this should be reported to aid reader in determining which chapters or pages are referred to, not the number of pages in the document unless all pages are relevant to the preparation of the document in which case the number of pages is superfluous. I tried to find an example of a correct reference, but could not find a single one. If USACE wishes to prepare a correct reference list, a good college thesis guide or English grammar handbook should be consulted. The format used is not important...only that the references be consistent in presentation.

I have reviewed the remaining chapters of the Himco Supplemental Characterization Report, dated September 2002.

Tables

1) Overall:
The Table corrections are acceptable.

Appendix M Toxicological Profiles

1) Overall

It appears that I received an incomplete Appendix M, as my copy of the document only contains tox profiles for Benzene and Iron. It is usual to include tox profiles for all contaminants of concern in any medium, but a more reasonable approach would be to include the profiles for all contaminants which exceed the 1E-06 risk level or a HQ of 0.1. I suggest that only the latter be included, and a justification in an introduction to Appendix M stating this be written. Of course, any contaminant that exceeds the MCL or any other health criterion should be included.

I would expect to see tox profiles for benzene, benzo(a)pyrene, bis(2-ethylyhexyl) phthalate, 1,2-dichloroproane, PAHs other than BAP, vinyl chloride, and the metals antimony, arsenic, calcium, copper, iron, lead, manganese, mercury, nickel, sodium, and thallium. The summary tables should be reviewed to make certain that I have not missed any relevant contaminants.

2) Toxicological Profile Requirements:

There appears to be some confusion as to what should be included in the toxicological information reported in the document text and in an appendix for this information. The appendix should contain a technical discussion of the available information. Information from the IRIS files....including the weight of evidence information and the toxicity values, information from the ATSDR tox profiles, ToxFAQs and MRL summary, and any other relevant data ...such as NRC or FDA dietary guideline...should be included. For lead, it is appropriate to mention the EPA models. More information on the presentation of the toxicological information can be found in RAGS (Part A), Section 7.7. For sodium, iron and calcium, it is necessary to discuss the NAS or FDA requirements and derived levels of concern

3) Benzene Tox Profile:

This profile appears to be based primarily on an outdated 1995 ATSDR tox profile, rather than the 1997 ATSDR Tox Profile. And, it does not include any information from the EPA IRIS 2000 file. The benzene summary should be updated using current toxicological information. A discussion of the IRIS toxicity values and information from the IRIS 2000 weight of evidence characterization for carcinogenicity should be included.

4) Iron Tox Profile:

The information from the 4th edition of Casarett and Doull may be out-dated; the information should be replaced with current information from the 6th edition (2000).

In the 3rd paragraph, acute is mis-spelled. Also, what is meant by acute overexposure?

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MEMORANDUM

DATE: August 15, 2002

SUBJECT: Review of the Draft Supplemental Site Investigations/Site Characterization Report, , Himco Dump Superfund Site, Elkhart, Indiana

FROM: Pat Van Leeuwen
Toxicologist/Superfund

TO: Gwen Massenburg
Remedial Project Manager

I have reviewed the Draft Supplemental Site Investigations/Site Characterization Report for the Himco Dump Superfund Site, prepared by the USACE and dated June 2002. This document is not complete yet, and review of some of thesel sections is needed in order to put the reviewed material in perspective. The document requires a lot of work and some sections will need significant editing. As much of this has been discussed extensively on our teleconference calls, what is needed in this risk assessment should be known to USACE. Perhaps this draft simply reflects the inability to complete the document on time, but much was omitted in this draft.

My comments on this draft are provided below.

Executive Summary

This entire section is very poor and does not sound like it was written by a risk assessor, as the concepts and terms are garbled and the primary points are not clearly identified or presented. There are also some significant technical errors....inconsistent reporting of significant digits, inconsistent reporting of results, etc.

Some simple generalities.....media do not have risks, only receptors have risks; exposure happens because of the activity or behavior of a receptor, so exposure must be described in terms of the activity; risk and hazard are the same thing; there is a potential for a risk or hazard

because of the activity of the receptor which results in exposure to contaminated media, and risk assessors are specific is describing these points; risks to receptors can be described in relationship to an activity which allows exposure to specific media (their pathway risk, such as ingestion of all contaminants in soil), or in relationship to all activities which lead to exposure to a single media (their media (exposure) risk, such as ingestion, dermal absorption and inhalation of ground water contaminants), in relationship to all activities which allow exposure to a single contaminant in all media (their chemical (exposure) risk, such as ingestion of arsenic in soil and arsenic in ground water) or in relationship to exposures to all chemicals in all media by all routes of exposure (their total receptor risk, such as total carcinogenic risk from ingestion of arsenic in soil and ingestion and inhalation of benzene in water), and it is usually useful to report risks in several ways in a systemic manner in order to determine whether the media, chemical or receptor scenario needs to be addressed. This should be the guideline for the summary and the ES.

I have highlighted some of the problems in this section below, but the whole section needs serious editing.

1) Executive Summary, ES-1, para. 1:
In the last sentence, change "analytical data" to "site analytical data".

2) Executive Summary, ES-1, para. 2:
In the last sentence, change "exposure to ground water by residences" to "exposure to ground water by residents".

3) Executive Summary, ES-1, para. 3:
In the second to last sentence, change "objective of the investigations were" to "objective of the investigations was".

4) Executive Summary, ES-2, para. 4:
Change "possible future risks" to "potential future risks".

5) Executive Summary, ES-2, para. 5:
Soils do not have a risk. Change this to something like "The risks from exposure to CDC soils were assessed...".

6) Executive Summary, ES-2, para. 5:
The sentence that begins with "The maximum derived concentration" is very confusing, and even I am not certain what the "maximum derived concentration" is or how it was used from the text. Does this mean that soil concentration values were derived for each parcel, and that the maximum parcel value was used in the modeling and RME estimates for each parcel? Say so more clearly. It might also be clearer if the phrase "represents the measured concentration" was omitted in the ES; this will be discussed (hopefully) in the development of the parcel soil concentration values in the body of the report.

7) Executive Summary, ES-2, para. 5:
Add "scenarios to" after RME. Modeled exposures or RME only exist in the context of a receptor.

8) Executive Summary, ES-2, para. 6:

Several concerns here. First, hazard and risk are redundant, so both words are not needed; this appears to be a pervasive error and should be corrected though-out this section and the document. Second, the phrase "ingestion and contact with metals" suggests that we are looking at the HI here, not the HQ (the HI is the sum of multiple chemical and/or pathway HQs). Please correct as appropriate.

9) Executive Summary, ES-3, para. 1:

Change "risk to ground water" to exposure to "ground water".

10) Executive Summary, ES-2, para. 5 to end:

Beginning in this paragraph and continuing though the reporting of the risk results, I see that the HIs are reported with 2, 3 or 4 significant digits. The accuracy should be the same in each estimate, and cannot be greater than the minimum number of digits measured in any input value. This is probably a pervasive error and will need to be corrected through-out the document. It is also an issue that was noted by EPA in previous drafts.

Also in this paragraph, the child HI to the well-pair is stated as 45.67, and the land parcel HI is 2.9, so I assume the latter is from soil exposure alone, but this is not clear. Clearly state what is being reported here, and in each case where the cancer risk or HI is reported..

11) Executive Summary, ES-2, para. 5 to end:

Also, beginning in this paragraph and continuing though the reporting of the risk results, the risks are reported in a sporadic and inconsistent manner, rather than in consistent and concise summaries that could be used to support risk management activities. Cancer and non-cancer risks to various receptors, media and parcels are presented in an incoherent manner, with the text jumping from one point to another. These paragraphs should be rewritten to present the risk estimates in the ES in a straight-forward and consistent manner which can be easily understood by the reader. The presentation should aim for the kind of repetitive reporting that allows comprehension and comparison of estimates across various strata.

Statement such as "overall, the only unacceptable risk..." only add contractor bias to the summary, and should be eliminated.

12) Executive Summary, ES-3, para. 2:

Add "soil exposure" after "overall risk to lead" in the last sentence.

13) Executive Summary, ES-3, para. 4:

In the first sentence, change "in ground water" to "of ground water".

In the third sentence, it is not clear what is meant by "for well-pair and direct-push points evaluated". Be more specific. ...such as... HI for the child resident from ground water exposures by all pathways to all contaminants detected in a combination of the well-pair and all direct-push locations considered to represent the impact on the eastern off-site residential area ground water?

Rewrite the last sentence to make it more coherent.

14) Executive Summary, ES-3, para. 5 and ES-4:

Separate the uncertainty and recommendations discussions into two paragraphs.

Re the uncertainty discussion, at the minimum, the discussion should identify the factors which lead to uncertainty in the risk estimates, and indicate whether they result in an over- or an under-estimation of risk. And it must be balanced. It is the usual practice to separate uncertainty factors into their respective categories. Some suggestions..... well placement and sampling factors (e.g., wells may not be located to characterize center of the contaminant plume; well locations not chosen to characterize contaminant concentrations to eastern area; well locations not adequate to determine if multiple plumes, although suggested by disposal practices; data not collected to characterize seasonal changes in flow rates or water table fluctuations; some wells no longer available...decommissioned or destroyed...for more recent sampling; not all wells sampled for all parameters in all sampling rounds; others?), analytical methodology factors (initially detection limits too high to detect contaminants of concern; QA/QC requirement changes over time; others?), contaminant exposure point concentration estimates (well-pair estimates may not be representative of residential well because location or depth inadequate; contaminant releases may be sporadic rather than ongoing, due to disposal patterns and practices; direct push well data not adequate for metal analysis; ground water flow rate may be variable due to industrial pumping; UC in volatilization modeling; etc) and receptor exposure assumptions (UC in intake rates; UC in toxicity values; swimming assumptions; dermal assumptions; etc). Some uncertainty can be eliminated, variability usually cannot. In the text, these factors are best presented in a table .....and there are lots of examples out in the public records.

I also find the statement about natural attenuation confusing, as the text indicates that there is no data to support it. Thus would it be equally likely that the contaminant level has remained constant? A balanced discussion would present the reasons why each would be likely or unlikely.

15) Executive Summary, uncertainty:

Uncertainty is only discussed for ground water . There should be an analogous discussion for the CDA soil and ground water exposures. There are certainly lots of issues here. Some suggestions.....soil not sampled in some parcels (parcel estimates may be under-estimated or over-estimated); few soil samples in some parcels may not characterize child or adult exposure areas; lead concentration in exposure (fine particle) fraction not determined (under-estimated); UC in soil ingestion rate; track-in by pets; etc. There are lots of issues with the ground water estimates .....include most of the parameters described above, as well as the use of data from a single well-pair to estimate side-gradient exposures.

16) Executive Summary, soil gas data:

The soil gas data could be discussed in the total risk for both areas or in the UC table.....e.g., suggest that vapor intrusion from landfill gas migration might present an additional pathway for exposure .....potentially off-site, probably on-site? Recommendations on future soil gas measurements might be useful, especially if an on-site use is anticipated..

1.0 Introduction

1) Page 1-1, para 1:

In the third sentence, change "analytical data" to "site analytical data".

2) Page 1-9, para 1:
It is not clear what is meant by "USEPA guidance risk characterization". Should this be "USEPA risk characterization guidance"?

3) Page 1-9, para 2:
Lots of errors in this paragraph; rewrite. The 1998 ground water data is not listed, but the 2000 analytical data is. Does this really mean that the 2000 data was used in the 1998 risk assessment or what? Also the sentence is awkward.....the and ..and ..and.... Also a problem with the last sentence... "dermal and inhalation ingestion during showering" and "uses from ground water".

4) Page 1-9, para 3:
What is meant by "appears to have been delineated"? It either was or wasn't; USACE did the work so I don't understand the need to be vague here.

5) Page 1-9, para 4:
I thought the objective of the 1999 soil gas investigation was to determine if volatile contaminants in soil gas were also migrating toward the Eastern residential area, not to quantify the lateral migration of these gases. Something is missing here.

2.0 Supplemental Site Investigation Tasks

1) Page 2-1, para 5:
Change "may" to "can".

2) Page 2-3, para 3:
Ibid.

3) Page 2-6, para 3, line 12:
Ibid.

4) Page 2-6, para 4:
Ibid.

5) Page 2-7, para 2, line 14:
Ibid

6) Page 2-7, para 4, line 3:
Correct "location" to "locations". In next sentence, change "may" to "can".

7) Page 2-9, para 3:
Change "may" to "can".

8) Page 2-9, para 4:
Ibid.

9) Page 2-10, para 2:
Ibid.

10) Page 2-11, para 2:
Ibid.

11) Page 2-11, last para :
Ibid.

12) Page 2-12, first sentence:
Change "were" to "was".

13) Page 2-12, para 2:
Change "in which" to "to which".

14) Page 2-12, last para:
Change "may" to "can".

15) Page 2-14, para 2:
The text seems to suggest that samples from monitoring well WTJ3 were collected and analyzed; the Table 2-1 summary indicates otherwise. Which is correct? Please edit the statement in this section if all wells except monitoring well WTJ3 were sampled and analyzed.

16) Page 2-17, para 2:
Change "may" to "can" in last sentence

17) Page 2-18, para 5:
Change "may" to "can".

3.0 Supplemental Site Investigation Ground Water Results

1) Page 3-3, bullets :
Bullets 1 and 4 are redundant.

4.0 Ground Water Investigation Overview

1) Page 4-9, para 5:
Change "may" to "can".

2) Page 4-9, last para :

Ibid.

3) Page 4-10, para 1:

Ibid.

4) Page 4-10, para 2:

Ibid. Two entries.

5) Page 4-10, para 3:

The discussion of problems encountered in the April/May 2000 collection of samples from these monitoring wells. seems to contradict the discussions in section 3.5.1 (which notes turbidity problems in the direct push samples only) and in section 3.5.2.4 (which reports metal concentrations for the April/May 2000 samples). Why aren't the problems reported in these earlier sections? Some consistency would be good.

6) Page 4-11, para 1:

The text here suggests that the emerging contaminant data may be used quantitatively in the risk assessment, while the text in section 3.5.2.6 indicates that these data are for informational use only. Again, be consistent.

5.0 Supplemental Site Investigation Soil Gas Results

No comments.

6.0 Supplemental Site Investigation CDA Soil Results

1) Page 6-1, para 2:

Change "may" to "can".

.7.0 Contaminant Fate and Transport

1) Page 7-1, para 4:

Does "from the Pleistocene" mean from the Pleistocene age or era? Change to make more readable by the public.

2) Page 7-1 to 7-4, tables:

Why are Tables 7-1 and 7-2 placed in the chapter instead of at the end of the document with the other tables. They should be moved to the Table section.

3) Page 7-2, Table 7-1:

Shouldn't the title of this table be "List of Contaminants with Elevated Detections by Media

Type"? No data, elevated or otherwise, is given here. Also, I don't think that all of these contaminants were detected at elevated levels in these media....e.g., lead in ground water, zinc in soil. But 1,2-dichloropropane was found at levels above the MCL in ground water. Please check these entries for accuracy.

4) Page 7-9, section 7.2.1:
I suggest that advection, dispersion and diffusion be defined; this is a public document.

5) Page 7-11, para 2:
Do not capitalize iron and manganese; also perhaps this should read "(e.g., oxides of iron, manganese)" as these are not the only metals that form hydrous metal oxides. Isn't this also true of metallic sulfates?

5) Page 7-11, last para :
I am not certain why the chromium valence state discussion is repeated again here, and in any case, it conflicts with the discussion in the first paragraph on this page. I believe that the latter is correct.....that oxidizing conditions favor the formation of the chrome +6 ion ($CrO4^{--}$), while reducing conditions favor the formation of the chrome +3 ion ($CrO2^{-}$). Perhaps the discussion in the last paragraph should simply be deleted?

6) Page 7-16, para 1:
The last sentence should be rewritten. I suggest breaking it into two sentences, and rewriting the second part....which begins with "which if you add up....". Perhaps it could read "Addition of the screened portions in any specific cluster of wells and comparison of the total screened length to the total aquifer thickness suggests that less than 15 percent of the aquifer thickness has been evaluated in the locations sampled."

7) Page 7-16, para 2:
Change "inviolate" to "non-volatile".

8.0 Over-all Conceptual Site Model

1) Page 8-1, para 2:
Another objective of the supplemental investigations was to evaluate the potential for off-site migration of volatile contaminants. This is not mentioned here; is this an over-sight?

2) Page 8-1, last para :
The first two paragraphs in section 8.2 repeat information given in section 1.1: Site Background. However, the information is not completely compatible. If this information is to be repeated here, please try to make it more consistent.

3) Page 8-2, para 4:
Non-volatile surface contaminants may also be carried into the indoor environment by track-in of soil dust. Soil-derived indoor dust should be included in the CSM, even if it is not quantitatively

evaluated. Pets can bring contaminants into the indoor environment.

4) Page 8-2, last para :

The first two sentences are not quite correct. Actually, some of the site-specific conditions listed will actually increase the potential for contaminant exposure rather than control it. For example, paved surfaces often result in the accumulation of contaminants above the ground in a more accessible area. Several investigations have shown that soil inorganics may be present in greater concentrations in streets, curbs and driveways than in soil due to ongoing accumulation by dust deposition, run-off, and soil and leachate pooling. These contaminants are then available for re-entrainment in dust, track-in to indoor areas and for direct contact. Pavement also prevents escape of soil gas volatiles to the ambient air, thereby aiding the build-up of higher concentrations of contaminants in the soil gas.

5) Page 8-3, para 5:

The last paragraph in this section is repeated in section 8.4. It should be deleted here, as section 8.4 is the logical place for this information. Move the last 2 sentences to the end of paragraph 1 in section 8.4.

6) Page 8-4, para 2:

Rather than stating that the risk assessment is attempting to be conservative, it would be better to say something to the effect that consistent with EPA guidance, this well-pair represents the best estimate of the most contaminated area of the ground water plume. The guidance is an old 1994 draft piece which is widely used in other regions. Region 5 guidance also says to use the 2-3 wells that best characterize the most contaminated portion of the plume that has potential to affect the receptors of concern. These are better and more defensible arguments for using this well pair; conservative is not necessarily better. In addition, it is not going to be clear to anyone reading this document why the choice of this well pair is appropriate unless there is some additional discussion of the other well-pairs that could also have been used, and why they were not chosen. This part of the assessment is neither clear or transparent to the reader.

7) Page 8-4, last para :

The use made of the residential well data should also be mentioned here.

8) Page 8-4, CDA and Eastern Residential Areas:

Mention also that soil gas data was collected and was used qualitatively to evaluate the potential for exposure to soil gas volatiles

9.0 CDA Supplemental and Down Gradient Ground Water Human Health Risk Assessment

1) Page 9-1, para 2:

Clarify that evaluation of the "no action" alternative is a requirement for the Baseline Risk Assessment; otherwise this will be confusing to some readers.

2) Page 9-1, second bullet:
Were the on-site dirt bikers considered to be recreational visitors or trespassers in this assessment? I can't believe that dirt biking was a planned recreational activity at this site.

3) Page 9-2, para. 1:
I have previously, on several occasions, commented on the use of the term "the acceptable Superfund carcinogenic risk range of 1 E-04 to 1 E-06", and have sent you the comments from the HQ Scientific Advisor (Peter Grevatt) on this topic. Yet this language appears again! Please change this text to indicate that the cancer risk exceeds the Superfund 1 E-06 point of departure for carcinogenic risk. There is nothing anywhere in the Superfund directives or recommendations to indicate that a risk of 1 E-04 or 1 E-05 will always be acceptable at any given Superfund site.

4) Page 9-2, para. 2:
The 4th sentence that begins with "If these chemicals are truly absent...." sound like it was written as a justification for the PRPs!!! Is this what we want to say? Perhaps we need to say that while this methodology appears conservative, it followed the risk assessment guidelines at the time, and that a reevaluation of the site risks using current guidelines would likely yield estimates in the range of 1E-03, due to the listed chemicals in ground water and soil. I think this entire discussion should be more carefully worded, as this is likely to be a point of contention on the CDA assessment.

5) Page 9-4, para. 4:
To the phrase "via ingestion and dermal contact with soil" add "and soil-derived dust".

6) Page 9-6, para 1:
The language in the second to last sentence is inappropriate. See comment #6 under chapter 8. The expanded discussion of the well-pair choice should probably be included here for clarity.

7) Page 9-6, 3rd bullet:
There appears to be some confusion here about "B" qualified data; the earlier (chapters 5 and 6) discussions of this qualifier indicate that it was only used if the amount of the contaminant was greater than 10x the blank concentration for the common laboratory contaminants or 5x the blank concentration for all other analytes. Data that did not meet this criteria were qualified "UB". According to RAGS, Part A, Section 5.5, data that are "B" qualified in this manner are to be considered as positive detects for the purpose of the risk assessment. This error should be corrected or a written justification for this deviation from RAGS, Part A, provided in this assessment.

8) Page 9-6, 5th bullet:
Actually, RAGS, Part A, section 5.4.1, stipulates that "J" qualified data should be used in the quantitative risk assessment "the same way as positive data that do not have this qualifier". However, if the "J" value contributes significantly to the risk, this should be discussed in the uncertainty section. It is not clear why this risk assessment does not follow RAGS, Part A. regarding the use of "J" qualified data

9) Page 9-7, last para.:

Sodium was elevated in previous sampling rounds of ground water, and this elevated concentration was the reason for prior ground water action in the area to the south of the Himco site. While the RDA for sodium is 1400-1500 mg/day for a healthy adult, the acceptable intake is 20 mg/L for those on a low sodium diet. Does this discussion mean that the risk to residents with hypertension is no longer present? I'm confused here. Why was the sodium eliminated?

10) Page 9-8, para. 2:

In the first sentence, change "data....is representative" to "data.....are representative". The second to last sentence contains a complex sentence; the subject is missing in the 2nd half of this sentence.

11) Page 9-8, para. 3:

I am not certain that the statements in this paragraph are true. The Region 9 tables are not the last word on toxicity. The Region 6 tables include additional chemicals that are of interest in that region, as do several State RBCA tables.

12) Page 9-10, 1st para.:

The non-residential default screening numbers quoted here were based on the incomplete results of the NHANES III study; they were updated in March 2002. As this assessment post-dates this Technical Review Workgroup guidance, the new data should be presented in this assessment.

13) Page 9-11, COPC list:

Calcium has been omitted from the ground water COPC list in this version of the CDC risk assessment; this would appear to be an error.

14) Page 9-13, 1st para.:

The location of the geostatistical analysis in this report should be given here. This analysis should be provided asap, because the estimation of the soil contaminant concentrations cannot be evaluated without it.

15) Page 9-13, para. 2:

As noted in the comments above, the phrase "in order to be conservative in the risk assessment" should be replaced with more appropriate language. Also include a discussion of other wells that could have been used in this assessment, and why these were chosen. A reader would want to know this, and it's part of that EPA clarify requirement.

16) Page 9-34, para. 4 and 6:

Do not report more significant digits for the HI than were calculated; 4 digits are reported here.

17) Page 9-35, para. 2 and 4:

Ibid. The second HI value is incorrect.

18) Page 9-37, para. 3 and 5:

Ibid.

19) Page 9-38, para. 5 and 7:

Ibid.

20) Page 9-39, para. 7 and page 40, para. 3:

Ibid.

21) Page 9-41, para. 3 and 5:

Ibid.

22) Page 9-42, para. 5 and 7:

Ibid.

23) Page 9-43, para. 7 and page 44, para. 2:

Ibid.

24) Page 9-44, para. 4:

The text list the construction worker HI as 0.72 for the CNS effects; while table 9-19 list the value as 0.74. The latter value appears to be the correct one.

25) Page 9-44, para. 7:

Change the reference to sections 5.8.3.21 and 5.8.3.22 to sections 9.8.3.21 and 9.8.3.22.

26) Page 9-45, para. 3 and 5:

Do not report more significant digits for the HI than were calculated; 4 digits are reported here.

27) Page 9-46, para. 4 and 6:

Ibid. It is totally unclear to me how the HI estimate of 45.67 could possibly be reported when the individual HQ estimates are reported to 3 significant digits.....and it is not clear that even these 3 digits are significant. This estimation has distorted the reporting of the non-carcinogenic risk estimates in every CDA land parcel, and makes the risk assessment look like nonsense. The number of significant digits in the final HQ calculation cannot be greater than the least number of digits in any input parameter.

28) Section 9-8 in general;

In reevaluating the cancer risk, HQ and HI values as suggested above, care should be taken to assure that numerical estimates are rounded in a consistent manner. EPA has previously discussed this issue with USACE, and recommended the following strategy: if the least significant digit is greater than 5, the next significant digit should be rounded to the next higher integer; if the least significant digit is less than 5, the next significant digit remains unchanged. If the least significant digit is a 5, then the next significant digit is rounded to the next higher integer only if that digit is an odd number (1,3,5,7,9); if the digit is an even number (2,4,6,8) it is not changed. These guidelines were not followed, and the risk values have not been reported in a consistent manner. All values should be reviewed, and corrected as appropriate.

29) Page 9-46, uncertainty analysis:

This is not a very robust uncertainty analysis. An uncertainty analysis discusses the difference between uncertainty (which can be reduced with more data collection) and variability (individual variability in behavior, absorption, metabolism and health outcome cannot be reduced....thus the use of the RME to protect the majority of the population of concern), identifies the various sources of uncertainty, and discusses their impact on the risk estimate. These can be broken into categories, such as sampling error, analytical error, representativeness of sample data, exposure assumptions, confidence in toxicity values, etc. Some examples are sampling error.....use of a single or few samples to estimate soil, which may result in either over- or underestimation of the risks; reproducibility of these data; use of well-pair to estimate risks in all parcels, which may result in over-estimation in some parcels, but this could also be a poor predictor of future exposure, which may be over- or under-estimated; use of the RME exposure parameters, which result in an over-estimation of some exposures if this behavior is not exhibited by the sub-population, etc. Both the table and the discussion need some beefing up if the document is to meet the EPA requirements for document preparation..

30) Page 9-47, section 9.10.1:

How can there be a section 9.10.1 when there is only 1 sub-section in section 9.10? Perhaps the various receptor population risks could be discussed in different sub-sections?

31) Page 9-47, section 9.10.1, para 1:

The risk summary is incorrect. The carcinogenic risk to the construction worker in parcel T is 4.6E-07.

32) Page 9-47, section 9.10.1, para 2:

We have discussed many, many times how these risk are to be reported to support the needed remedial actions in the CDA, so this summary discussion is totally unacceptable. Not only the total risks are to be reported, but the ground water risks and the soil risks as well. Perhaps these need to be separated into 3 separate paragraphs to make clear what is of concern in the CDA. It is obvious that the carcinogenic risk to soil exceeds 10-6 in ALL parcels, and that the carcinogenic risk to soil exceeded 10-4 in 2 parcels as well; so the summary here is a serious misrepresentation of the situation. Likewise, the non-carcinogenic residential risks due to soil exposure are exceeded in 2 parcels. This section should be re-written.

33) Chapter 9, in general:

EPA has provided a great amount of guidance on how to complete the risk assessment for the CDA to support any actions to be taken by the risk manager. In particular, the comments I provided in May 2001 and in October 2001 on the CDA assessment should be reviewed again; many of these issues have not been addressed in this assessment and may need to be included in this document.

10.0 Eastern Off-site Residential Human Health Risk Assessment

1) Page 10-1, para 1:

I do not see mention of the residential well data here, although section 4.2.7 indicates that the residential well data will be used in the risk assessment. This applies to volatiles, semi-volatiles, metals, bromide and sulfate data from the March, April/May and November 2000 sampling events.

2) Page 10-2, para 3:

I suspect that some readers are going to get a jolt from the phrase "receptors are defined as humans residing nearby.."! I suggest that this be changed to: receptors are defined as residents living immediately to the East of the Himco Dump Site. If we need to be more specific, the text could say adult and child residents.....

3) Page 10-2, para 5:

I don't understand this discussion; it appears to have been copied from the CDA risk assessment and is not at all relevant to this assessment. Not only can ground water be used because the "private wells are still in place", the private residential wells are the sole source of drinking water and water for other household use in this residential area. Also, what excavation or construction is being considered here...this is not a relevant discussion because the greatest threat is to the resident. Perhaps some really relevant information can be included here.....such as the potential depth of the residential wells (the depths of some are known), the hydrogeology which makes contamination of the lower aquifer a concern in this area (bromide data), the potential for increased ground water migration to the East with seasonal changes or increased pumping of the municipal wells, and other reasons why ground water in this area was considered to present a concern.

4) Page 10-2, para 6:

What are "contaminants in VOCs"? Clearer terminology is needed here.

5) Page 10-3, para 1:

Actually, these data and the contour maps are discussed in section 5.2.2. It would seem relevant to include some of this information here. It will be obvious to community members that read this report that the contour maps show migration into the Eastern residential area. It will also appear as though EPA is ignoring this unless the discussion is more complete.....e.g., the data are not suitable for modeling volatile gas concentrations in ambient (outdoor) air or indoor air, however the data were fitted to contour plots, which are presented in..... Such a discussion will be more useful to these residents.

6) Page 10-3, para 2:

State how the data from the residential well sampling was used.

7) Page 10-3, 3rd bullet:

This treatment of B qualified data is not consistent with earlier text and RAGS, Part A. See comments above on this issue.

5) Page 10-3, 5th bullet:

This treatment of "J" qualified data is not consistent with earlier text and RAGS, Part A. See

comments above on this issue.

6) Page 10-5, chemical list:

Sodium does appear to have been retained in this assessment, even though the presence of this contaminant was the basis for ground water actions taken in the area to the south of the landfill. The screening value listed for sodium is in table 10-1 is 5,000 mg/l (basis for this is unclear). The RDA for sodium is 1400-1500 mg/L (sex differences) and the level of concern for a low sodium diet is 20 mg/L. Levels as high as 125 mg/l are found in WT114A and in residential wells.

7 Page 10-6, para 3:

So why were these wells chosen for this assessment? Could other wells have been used? The reader will want to know this. I want to know this. The wells are separated by some distance; do the concentrations differ? Does the data present a consistent picture of the contaminant migration? Tell the reader something relevant here!

8) Page 10-6, section 10.3.3.1:

This section appears to be a non-consistent repeat of what is presented in section 10.3.2.3; the prior section has already discussed the toxicity screening for ground water. The prior section indicated that 2000 Region 9 PRGs were used for comparison, so there is also an error here. What is meant by "based on potential ingestion of ground water"? What else would these residents drink? Why is there a section 10.3.3.1, if this is the only media being discussed. Of course, a more robust risk assessment would discuss the chemicals concentrations in the monitoring wells in one sub-section, and then discuss the data from the residential monitoring wells in the next sub-section. The latter would confirm the concern that residents are currently being exposed to these contaminants; for example, the 1,2-DCP maximum level in the monitoring wells was 2 ug/L, while the residential well data showed levels of 8-10 ug/L (3 different sampling periods) in one well. The MCL for 1,2-DCP is 5 ug/L. Can EPA hope for a higher level of understanding in this assessment? Somehow, this assessment needs to move beyond the theoretical (potential ingestion of ground water!) and present some concrete evaluations.

9) Page 10-7, para 1:

Do not describe these receptors as "human living nearby"! See comment on this issue in Chapter 9 comments. But this paragraph on receptors does not even belong here, nor does it need to be repeated 3 times! The exposure area is the residential area to the east of the Himco Landfill site. The concern is the use of private wells in this area. What more needs to be said?

10) Page 10-7, para 2:

Explain <u>why</u> the direct-push locations "most likely represent the screened intervals" for these private wells? Is this an opinion, or is there some data that can be discussed here? This a very weak and unsupported statement.

11) Page 10-8, para 3:

Here it is again. Just move the text in section 10.4.2.1 to the section 10.4.1.2 discussion of

receptors

12) Page 10-11, para 1:.

Ingestion of COPCs in drinking water is more than plausible here, it is the likely scenario. We are not speculating here; the contaminants are in these private wells!

13) Page 10-15, para 2:

I am totally lost here. What is the "ground water hypothetical exposure location"? This paragraph sounds like it was lifted from the CDA assessment; it does not make much sense here. It also suggests that the maximum contaminant level in any of this wells was used in the assessment, even though these wells are pretty far apart and do not represent a single location, which is likely to sound like nonsense to the reader. So it would seem necessary to explain why the concentration data from the WT/GP 101 cluster were used for some contaminants, while the data from the WT/GP114 cluster were used for others. And one detect from the GP16 well was used. The reader will never understand this without some further explanation, which may need to include a discussion of the findings in the private wells.

14) Page 10-15, para 4:

Well, this would appear to represent a conservative, but potential risk from these various well locations, but it is very hypothetical. It would appear that the real risk here is from ingestion of arsenic and 1,2-DCP in ground water, the latter concentration having exceeded the MCL level in private well samples; then there is vinyl chloride, chloroform and some other carcinogens which add to the concern. So how is this information going to be used? I am not certain that this rather wishy-washy hypothetical assessment of risk is going to support any action at the site. But then I am also confused by the risk numbers shown here. If the Region 9 PRG table indicates that 5 ug/L represents a 1 E-04 risk, how was a risk estimate less than 1 in 1,000 derived in this assessment? Should this be 5.4E-03?

15) Page 10-15, para 5 and page 10-16, para. 1:

Do not report more significant digits than can be calculated from the data.

16) Page 10-16, para 1:

But both the carcinogenic and non-carcinogenic risks to 1,2-DCP would appear to be underestimated; the concentration in the monitoring well is 2 ug/L as opposed to 9 ug/L (average value) detected in a private well. So shouldn't this be explained?

17) Page 10-16, para 2:

Table 9-21 is specific to the CDA assessment; it is not really relevant to this assessment. A separate uncertainty table and discussion should be provided for the EA.

18) Page 10-16, section 10.10:

Add a section 10.10.1, in which the residential well data is discussed.

19) Chapter 10, in general:

Over-all, this is the most wishy-washy, redundant, confusing and incomplete risk assessment I

have reviewed. The focus of this chapter should not be a primer on how to do a ground water risk assessment. The assessment needs to be more focused on the data available for the assessment, how it was used, and what the potential risks associated with the use of residential wells in this area as a source of drinking water and for other domestic uses are. It should discuss the multiple tiers of data available for the assessment (remember that we discussed a preference for a tiered approach here.....looking at on site monitoring wells, off-site monitoring wells, geoprobe data and residential well data) and how these data support EPA's over-all concern with the use of ground water in this area.

11.0 Conclusions and Recommendations

1) Overall:

A rambling 6 page narrative, with no organization, is not very useful. Each area assessment and each media assessment should be discussed in a separate sub-section. The text should summarize the results of the CDA assessment and the Eastern residential area assessment in a manner that allows easy identification of the media, location and levels of risk. For example, EPA has repeatedly asked for a table which summarized the soil, ground water, and total risks for the CDA in a single table. I still do not see this information. A clear presentation of how the ground water contamination was characterized (include tables or maps that show the relationship of the contaminant locations and contaminant concentrations) and what concerns emerged from this assessment should be provided in the EA discussion. The soil gas data, and the implications of these data should be discussed under the section on the soil gas. And so on.

Deficiencies and uncertainties in the assessment(s) should be identified, and recommendations for monitoring, installation of additional wells, alternate methods for sampling or analysis, etc. provided. The recommendations should be provided in a manner that allows them to be found easily.....in a separate paragraph at the end of each sub-section or a all together in a recommendation section...perhaps with bullets. This summary should reiterate the need to develop a comprehensive picture of the risk posed by migration of contaminants into off-site area and the difficulties encountered in the use of data from many different site investigations, that in some cases, new investigations as new releases of contaminants were identified..

The bottom line is that this section should pull-together what was attempted and what was found (risks estimates and other data) in a manner which makes the develop and enforcement of any remedial actions a logical conclusion.

12.0 References

1) Overall:

A number of the references are incomplete; correct these references.

2) USEPA 1989b:

What is this? The document referenced here would not be appropriate for use in a current risk

assessment. The current hard copy of the EFH is dated August 1997; the electronic version carries a February 1999 data. The EFH is listed twice in the references.

3) USEPA 1991c:
It is not clear how this document was used. The material here was replaced and updated in the Residential Soil Screening Guidance and Technical Background documents issued in May 1996.

4) Lead guidances:
Neither lead guidances are listed in the references, but although they are mentioned in the text, they were never used in these assessments. The IEUBK Model is not referenced and the Adult Lead Modem reference refers to a correction to the ALM suggested by Van Leeuwen and White. The correct references should be supplied; everything is on the EPA website.

5) Casarett and Doull"s Fourth Edition:
Did USACE really using this edition of C&D? The 6th edition came out last year! It would be good if this assessment used up-to-date information.

Tables

1) Table 3-3:
Are the results reported really in mg/L as indicated here? I don't think so!

2) Table 9-2:
Where did the calcium screening number of 4,000,000 mg/kg come from? I don't think this is in Region 9's table.

3 Table 9-9:
What does the footnote "l" refer to here? In an Agency document, use either Pat Van Leeuwen or Dr. Van Leeuwen, not Ms. Pat Van Leeuwen.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MEMORANDUM

DATE: October 31, 2001

SUBJECT: Review of the revisions to the Final Supplemental Field Investigation/Risk Assessment Technical Memorandum, Himco Dump Superfund Site, Elkhart, Indiana

FROM: Pat Van Leeuwen
Toxicologist/Superfund

TO: Gwen Massenburg
Remedial Project Manager

I have looked at the revisions to the corrected Final Supplemental Field Investigation/Risk Assessment Memorandum for the Himco Construction Debris Area (CDA), received from the Army COE on October 10, 2001. This document does not seem to be complete yet, and requires more discussion of the data and results. I suggest that several additions be made as soon as possible, and this document finalized.

My comments are provided below in **red bold.**

Comment 1) Section 5.6.2.3 Off-Site Construction Worker

I have requested an explanation of the construction worker scenario three times. In response to my latest comments regarding the poorly documented construction worker scenario, the contractors submitted the following revision:

"**Response:** Section 5.6.2.3 will be revised as follows:

5.6.2.3 Current and Future Off-Site Construction Worker

A current and future off-site construction worker was defined as an individual who works in the CDA near the Himco landfill site, and is involved in resident home improvement construction projects. Therefore, individuals assigned to short-term intrusive construction projects needed to be evaluated. The construction worker was assumed to be an average adult with a body weight

of 70 kg who was exposed to site elements approximately 30 days per month for 6 months, or 180 days. It is likely that a construction worker would work at the site 180 days/year for one year for a home-improvement construction project. An incidental soil ingestion rate of 480 mg/day was based on adult ingestion of soil and dust engaged in outdoor activities (EPA, 1997b). The fraction of exposure attributed to site soil ingestion was assumed to be 1. Finally, a respiratory rate of 20 m^3/day was used (EPA 1991a). "

As you can see from the comments below, the response is even more confusing and does not meet the requirements of a credible response. This should not be a difficult task, however you can see from the following statements that the revisions provided fail miserably.

*** In the August 2001 draft, the construction worker is stated as working "5 days per week", which is not only a reasonable but also an expected assumption.**

*** In the revisions provided on 10/11, the construction worker is now assumed to work "approximately(?) 30 days per month for 6 months". That's 7 days a week, which is not a credible assumption to me and will not be credible to anyone else because I don't believe anyone knows anyone who routinely 180 days in a row. Some readers may even believe that EPA is projecting 6 week months.....perhaps a more credible assumption.**

*** The revisions then go on to explain that this exposure of 180 days in a row should be averaged over a one year exposure duration because this is a one year home-improvement project. What am I missing? If the project takes 6 months, as stated, why is it a one year project with exposure averaged over the extra 6 months that the construction worker does not work (or total of 365 days)?**

I am no longer going to suggest that the contractors correct this scenario. I insist that the construction worker scenario be described as 180 days of exposure which occurs over 38 weeks (approximately 9 months) following a 5 day per week work schedule. This is a credible routine worker scenario. The 38 weeks contain 190 workdays (38 x 5 = 190), so the 190 days must be explained as being adjusted to allow for 10 days of inclement weather when the worker cannot work outdoors. The exposure time is to be averaged over 266 days (38 x 7 = 266), not 365 days, as the non-carcinogenic effects are reduced when the exposure stops. The cancer exposure remains the same.

The text and the non-cancer risk estimates will need to be adjusted to address these changes. It is clear that the non-cancer risks to the construction worker will be increased.

Comment 2) All correction are acceptable.

Comment 3) Section 5.10
A few minor corrections are still needed in this section:

5.10.1 CDA Soils

For the construction worker, the estimated incremental lifetime cancer risks (ILCRs) due to site-related chemicals in soil only at Land Parcels S, F, and D are above 1 in 1,000,000 (1E-06). Parcels Q, R and T

would probably also be above the risk level but were not sampled or assessed; this is a data gap in this report. The estimated risks to chemicals at Land Parcels S, F, and D are 2.2 in 1,000,000 (2.2E-06), 9.4 in 100,000 (9.4E-05), and 1.7 in 1,000,000 (1.7E-06), respectively. Overall, the only unacceptable soil non-cancer hazard risk (HQ > 1) to the future construction worker is in Land Parcel F (HQ 1.3) and is due to ingestion of and dermal contact with metals (Table 5-28). **The non-carcinogenic risks are incorrect; adjust the calculations and text.**

Estimated site-related ILCRs for the adult resident for soils at all Land Parcels are above 1 in one million (1E-06) and are attributable to arsenic, benzo(a)pyrene at all Land Parcels and dibenz(a,h)anthracene at all **evaluated** Land Parcels except for Land Parcel N.. Only Land Parcels S and F exceed the upper end of the acceptable Superfund carcinogenic risk range of 1 in 10,000 (1E-04). The estimated risks at Land Parcels S and F are 1.1 in 10,000 (1.1E-04) and 1.5 in 10,000 (1.5E-04), respectively. **But because Parcels Q and R lie between these two, there is probably some concern for these parcels as well; this is a data gap.** The non-cancer risks in all Land Parcels **evaluated** for the child resident (the more conservative non-carcinogenic assessment) **have** a total HI by target organ of less than 1, except for Land Parcel F (Table 5-29; **the latter is** primarily due to inhalation and ingestion of mercury **in soil.**

For surface soils, the EPA Office of Solid Waste and Emergency Response directive includes 400 mg/kg lead screening level for residential soil as an appropriate screening level for inorganic lead (EPA, 1998a, 1994c). At the Himco CDA, lead was detected above the residential screening level in Land Parcel F in one surface soil sample at an estimated concentration of 695 mg/kg. Lead was also detected in other surface, near surface and subsurface soil samples at Land Parcels F, D, S and O (no soil samples were collected at Land Parcel N). Although the concentrations detected were below the screening level, the concentrations represent lead concentrations in unsieved samples. It has been determined that lead is enriched in the fine particle fraction from sieved soil samples. Therefore, the total soil concentrations may be an underestimate of the overall risk to lead in the identified parcels.

At Land Parcel N, no soil samples were collected and soil concentrations in surrounding land parcels were projected into Land Parcel N in order to evaluate the risk. **Parcels Q, R and T were not sampled, and were not evaluated.**

As you can see I have some problem with this later problem. If soil concentrations from adjacent parcels were projected to Parcel N, why weren't these parcels also evaluated? This is not clear to me, and will not be clear to the reader. It is probably better to assume that the contaminants apply to the CDA in these parcels as well.

5.10.2 Down gradient Shallow Aquifer Ground Water

Environmental contamination in the down gradient shallow aquifer ground water does appear to pose an unacceptable health risk to the adult and child resident if used for drinking, showering/bathing and household activities.

Estimated site-related ILCR for the adult resident to ground water at well-pair WT101A/WT114A hypothetical exposure location is 3.8 in 10,000 (3.8E-04). For the child resident, the total HI is 26 (Table 5-24).

Estimated site-related ILCR for the adult resident to ground water at well WT115A hypothetical exposure location is 6.2 in 100,000 (6.2E-05). For the child resident, the total HI is 17 (Table 5-25).

Estimated site related ILCR for the adult resident to ground water at well-pair WT116A/WT119A hypothetical exposure location is 1.6 in 10,000 (1.6E-04). For the child resident, the total HI is 25 (Table 5-26).

It is not clear why WT111A was not sampled in 1998, and I believe that the ACE made a recommendation that the 1995 data from this well not be used in this assessment because the data represents a single sampling of a single well. However, nowhere in the report does it state why this data was not used, and why the data from well pair WT116A/WT119A were used for parcels west of WT111A. Clearly the argument that this well pair is more representative of the shallow groundwater in this areas is not very convincing. I have suggested that the WT111A data be evaluated, and that the uncertainty in using this single sampling point be clearly documented in the risk assessment. This well, as well as the data from the WT116A/WT119A well pair could be used to derive a range of risks for shallow groundwater for Parcels M.N.O and P. Adequate data has not been collected to fully evaluate this risk in these parcels, but the inclusion of the Wt111A data in the assessment is clearly required for consistency and completeness. think that this did not become fully apparent until we were able to see the Parcel risks more clearly delineated. I do not believe that it should be a major task in add the evaluation from this well to the assessment.

5.10.3 CDA Soils and Down gradient Shallow Aquifer Ground Water

For the construction worker, the estimated incremental lifetime cancer risks (ILCRs) due to site-related chemicals at Land Parcels S, F, and D are greater than 1 in 1,000,000 (1E-06). The estimated risks to chemicals at Land Parcels S, F, and D are 2.2 in one million (2.2E-06), 9.4 in 100,000 (9.4E-05), and 1.7 in one million (1.7E-06), respectively. Overall, the only unacceptable non-cancer hazard risk (HQ > 1) to the future construction worker is in Land Parcel F (HQ 1.3) and is due to ingestion of and dermal contact with metals **in soils**. Exposure of the construction worker to ground water was not evaluated (Table 5-28).

Estimated site-related ILCRs for the adult resident at all Land Parcels are greater than 1 in one million (1E-06) and are attributable to arsenic, benzo(a)pyrene and dibenz(a,h)anthracene in soils and arsenic, benzene, and bis(2-ethylhexyl)phthalate in ground water. **But there are 2 parcels that have risks in soil that exceed 1E-06! So this is not correct** The non-cancer risks in all land parcels for the child resident (the more conservative non-carcinogenic assessment) are greater than 1. This is primarily due to risk to ground water. The estimated site-related HI for the child resident for well-pair WT116A/WT119A (the well-pair in the closest proximity to the parcels of land being evaluated) is 25 (Table 5-29). The unacceptable non-cancer hazard risk is due to antimony, thallium, benzene and 1,2-dichloropropane in ground water and antimony, arsenic, copper, manganese and mercury in soil.

This section should updated to be consistent with the previous comments

4) Section 6.0

Response: Chapter 6.0 will be revised as follows.

6.0 CONCLUSIONS AND RECOMMENDATIONS

~~Sufficient~~ **Additional** data has been collected from within the Himco CDA to characterize the nature of soil contamination in this area. **This discussion needs to clarify that Parcels N, Q, R and T were not**

sampled, and how these parcels have been addressed. Several PAHs were detected in both surface and subsurface soil from sampling locations SB04, SB05, SB11 and SB13 through SB20. In addition, two semivolatile compounds (1,2-dichlorobenzene and 4-methylphenol) were detected at sampling locations SB16 and SB20, respectively. Each of the 23 TAL metals were detected at least once. Arsenic was detected at elevated levels in all soil samples. Lead and mercury were detected at elevated levels in one soil sample each, SB15-0.5 and SB20-0.5, respectively. However, the lead concentrations are from total soil samples; unsieved.

There should be a discussion on the 1995 ground water sample results here as well, not only the 1998 results. It is not clear why there is so much difference between these two sets of sampling results, but the most probable explanation is that the data represent two different aquifer conditions. The uncertainty in the ground water estimates, based on only two sampling rounds should be explained in the assessment. Two sample rounds do not characterize an aquifer. I had suggested during the preparation of the first draft risk assessment that prior data be summarized and used for comparison with the present ground water characterizations to provide additional support for the values used and for documentation of the variability of the contaminant concentrations found in the site wells. However, that comment, like many others, fell by the wayside, and I have not seem any reference to prior data collected at the site. In the latest assessments. This is not the best way to reduce the uncertainty or support the decisions which need to come from this and other documents. If this data is not going to be used as supporting data in this assessment, it should be brought forth in the overall ground water assessment.

The only volatile organic compound detected during the 1998 ground water sampling effort was 1,1-dichloroethane. Phthalates were the only semivolatile organic compounds detected during this round of ground water sampling. Except for cadmium, thallium, and vanadium, all of the TAL metals were detected at least once.

Multiple organic volatiles were detected in the soil vapor samples. The most predominant group in terms of concentrations detected are the chlorinated ethenes (tetrachloroethene, trichloroethene, dichloroethene and vinyl chloride), followed in decreasing concentrations by the chlorinated ethanes (trichloroethane, dichloroethane and chloroethane) and BTEX compounds. All compounds appear to be distributed similarly with the more elevated concentrations noted just off the south boundary of the landfill, and a decreasing trend moving away from the landfill perimeter. In all cases, the highest detected concentrations are located in the southeast corner of the site just northwest of the intersection of County Road 10 and John Weaver Parkway. The limit of soil vapor contamination appears to have been delineated with the exception of the east side of John Weaver Parkway. It is recommended that additional soil gas sampling be conducted along the east side of John Weaver Parkway to delineate the extent of soil vapor contamination.

There should be a discussion of why the shallow ground water data was used in this assessment. The wells in this area were screened in the shallow aquifer, so are these monitoring wells considered to represent the contaminants found in private wells or just the contamination derived from the CDA area. I think that the work plan for the risk assessment should be reviewed and this document should reflect the purpose of the shallow ground water analysis more clearly. There is also data from deep wells in the area, and the suggestion that the site contamination is more likely to be seen in diving plumes, some of which may be deeper even than any deep residential wells that are still in place in this area. In short, the discussion and conclusions section should make clear why this data was used and whether the analyses provided in this risk assessment are sufficient to draw any conclusions about the existing private wells and risks from their use.

The results of the human health risk assessment indicate the following:

Maybe the first bullet should address the adequacy of the data and the strength of the conclusions based on these data. Are there uncertainties in the soil data? What about those parcels that were not sampled? In the following bullets, a rehash of the numbers one more time does not seem to be what is expected as a conclusion or recommendation. Thess summaries would benefit from a bit more discussion of the results..

- For the construction worker, the estimated incremental lifetime cancer risks (ILCRs) due to site-related chemicals in soils only at Land Parcels S, F, and D are greater than 1 in 1,000,000 (1E-06). The estimated risks to chemicals at Land Parcels S, F, and D are 2.2 in 1,000,000 (2.2E-06), 9.4 in 100,000 (9.4E-05), and 1.7 in 1,000,000 (1.7E-06), respectively. Overall, the only unacceptable non-cancer hazard risk (HQ > 1) to the future construction worker is in Land Parcel F (HQ 1.3) and is due to ingestion and dermal contact with metals. **Address the parcels which were not sampled**
.

- Estimated site-related ILCRs for the adult resident for soils at all Land Parcels **sampled** are above 1 in one million (1E-06) and are attributable to arsenic, benzo(a)pyrene, and dibenz(a,h)anthracene. Only Land Parcels S and F exceed the upper end of the acceptable Superfund carcinogenic risk range of 1 in 10,000 (1E-04). The estimated risks at Land Parcels S and F are 1.1 in 10,000 (1.1E-04) and 1.5 in 10,000 (1.5E-04), respectively. The non-cancer risks in all Land Parcels for the child resident (the more conservative non-carcinogenic assessment) has a total HI by target organ of less than 1, except for Land Parcel F (Table 5-29), primarily due to inhalation and ingestion of mercury. **Parcels N, Q, R and T were not sampled, so what is the recommendation for these parcels?.**

- At the Himco CDA, lead was detected above the residential screening level in land Parcel F in one surface soils ample at an estimated concentration of 695 mg/kg. Lead was also detected in other surface, near surface and subsurface soil samples at Land Parcels F, D, S and O (no soil samples were collected at Land Parcel N, **Q, R or T**). Although the concentrations detected were below the screening level, the concentrations represent lead concentrations in unsieved samples. It has been determined that lead is enriched in the fine particle fraction from sieved soil samples. Therefore, the total soil concentrations may be an underestimate of the overall risk to lead in the identified parcels.

- Estimated site-related ILCR for the adult resident to ground water at well-pair WT101A/WT114A hypothetical exposure location is 3.8 in 10,000 (3.8E-04). For the child resident, the total HI is 26 (Table 5-24).

- Estimated site-related ILCR for the adult resident to ground water at well WT115A hypothetical exposure location is 6.2 in 100,000 (6.2E-05). For the child resident, the total HI is 17 (Table 5-25).

- Estimated site related ILCR for the adult resident to ground water at well-pair WT116A/WT119A hypothetical exposure location is 1.6 in 10,000 (1.6E-04). For the child resident, the total HI is 25 (Table 5-26). **It should be clearly stated that this well pair was used to evaluate ground water risks in all parcels evaluated, as per the Draft January 6, 1998 Workplan for Supplemental Site Characterization and Access Controls at the Himco Landfill NPL Site, Elkhart, Indiana (ref) and the Final ACOE Workplan (complete citation). The uncertainty is using this well pair for the more westerly parcels should be communicated. There should be some discuss**

of the data variability in these two sampling rounds, and perhaps some supporting discussion from prior sampling rounds as to why the concentrations used in the assessment are appropriate.

* **The data from well WT111A should be presented. This data should also be used to characterize the more westerly parcels....including N,M,O,and P. The uncertainty in the use of data from a single sampling should be discussed. Other historical data on this well can be used to discuss the uncertainty in the 1995 data.**

- Estimated site-related ILCRs for the adult resident for both soil and ground water at all Land Parcels are greater than 1 in one million (1E-06) and are attributable to arsenic, benzo(a)pyrene and dibenz(a,h)anthracene in soils and arsenic, benzene, and bis(2-ethylhexyl)phthalate in ground water. The non-cancer risks in all land parcels for the child resident (the more conservative non-carcinogenic assessment) are greater than 1. This is primarily due to risk to ground water The estimated site-related HI for the child resident for well-pair WT116A/WT119A (the well-pair in the closest proximity to the parcels of land being evaluated.....**no justification provided for this statement)** is 25. The unacceptable non-cancer hazard risk is due to antimony, thallium, benzene and 1,2-dichloropropane in ground water and antimony, arsenic, copper, manganese and mercury in soil.

- Environmental contamination in the down gradient shallow aquifer ground water does appear to pose an unacceptable health risk to the adult and child resident if used for drinking, showering/bathing and household activities. **This is a pretty strong statement, but can it be supported as stated . Some further discussion is clearly needed; see initial comments above. Discuss the choice of wells, shallow versus deep wells as source of drinking water in the area and what other data might be used to support the conclusion that residents should not use private wells. Are there some recommendations for reducing the uncertainty in the ground water analysis provided here.**

This can be in the recap and final recommendations. But is it all? What about the deep well data? What about other well locations....was the sampling data adequate to the assessment? For risk management? What about the soil.....especially in un-sampled parcels. Are these residents safe? Lots more to add here, if this is going to be comprehensive. Uncertainty in the estimated risks from exposure to Himco area shallow aquifer downgradient ground water is based upon two sampling events, with organic constituents detected in the 1995 sampling event, and virtually none detected in 1998. In addition, detection limits were not always sensitive enough to assess the presence or absence at the screening levels. Therefore, it is recommended that additional ground water sampling be performed to confirm the absence of the organic constituents that contribute to the Himco area ground water risk. It is also important to note that there are a number of residential wells surrounding the CDA that were not sampled. The current residential receptors that do reside in the Himco CDA are not using area ground water for household uses, but could be using the ground water for outdoor use. Therefore, it is also important to include these wells in future sampling events. Although the soil gas data collected in this investigation were not included in the risk assessment, some uncertainty in the total media risk calculated for each land parcel is assumed based on the extent of soil gas migration that is shown to have occurred.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
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MEMORANDUM

DATE: May 17, 2001

SUBJECT: Review of the "Final" Supplemental Field Investigation/Risk Assessment Technical Memorandum, Himco Dump Superfund Site, Elkhart, Indiana

FROM: Pat Van Leeuwen
Toxicologist/Superfund

TO: Gwen Massenburg
Remedial Project Manager

I have reviewed the Supplemental Field Investigation/Risk Assessment Memorandum for the Himco Construction Debris Area (CDA), dated March 2001. The new organization of the document is good, and much more readable. I have a large number of comments, but most are pretty specific and only require simple corrections. I suggest that the contractors review these comments, and that we only discuss those specific comments that are not clear; that should save further time and money.

My comments on the document follow.

1) **Title Page**. The document is labeled "Final". All documents submitted by the US Army Corps of Engineers should be labeled "Draft" or "Draft Final" until approved by the EPA.

2) **Page ES-2, 2nd para, line 1**. To avoid confusion, it is better to use "greater than" rather than "above" when talking about risk levels. Also be consistent though-out the document. These concepts are confusing to the public.

3) **Page ES-3, 1st para.** I don't agree with the speculations presented in the second sentemce. There are many reasons why the contaminant levels between two sampling rounds may differ .... including seasonal and meteorological changes. In addition, the new data from the 2000 sampling events, using lower detection limits, are more consistent with results from 1995; they show much higher levels of

contaminants than detected in 1998. Perhaps the 1998 laboratory analyses were not very good. In any case, these statements do not appear to be appropriate, given the date of this report and the additional data that is available.

4) **Page 1-2, 3rd bullet.** Same as # 2 above....."less than" is a better descriptor for risk than "below" in written documents.

5) **Page 2-2, Section 2.3.1, 1st para.** List which parcels were not sampled (N,T,R.and Q), and which were not assessed for risk.

6) **Page 2-5, Section 2.3.4 and Table 3-2.** The August 15, 2000 groundwater summary tables provided by ACE list other wells sampled in 1998 as WT101B and WT101C, but they are not listed in this report. Is there a reason?

7) **Page 3-3, Groundwater, 3rd para, last sentence.** Phthalates were detected at reasonably high levels in groundwater. Because the solid waste is in direct contact with the water table at the Himco Dump site, and many waste materials that were disposed-of at the dump could have contributed to detectable levels of phthalates in groundwater, I am not certain why it would be "extremely doubtful" for these compounds to be associated with the Himco site. Phthalates are frequently found in groundwater near waste sites and landfills. Risk estimates for phthalates are reported in the ES. What am I missing here?

8) **Page 3-3, Ground water, last para, last sentence.** Arsenic is reported in 5 well locations at 6 concentration levels, "respectively". What is missing? Is one of the samples a duplicate? Which?

9) **Page 3-5, 1st para, last sentence.** What "reporting limits" are referred to here?

10) **Page 3-5, Ground water, 2nd para.** The benzene concentration in well WT116A is reported as 14 µg/l here and in Table 3-3, and 15 µg/l on page 2-3. Some consistency would be good.

11) **Page 4-2, last bullet.** So are the metal estimates conservative if the preservative was not adequate? There would be a potential for adsorbance of metals to the glass. Is this a point to make in the uncertainty tables and conclusions?

12) **Page 5-4.** A sentence relating the last two paragraphs to what is being considered at this site and in the CSM would put the rather generic discussion provided in this section in context.

13) **Page 5-6, Section 5.3.3.2.** It would seem relevant to state that although the residents are currently on a municipal water supply, private wells are still in place and *could* be used as a drinking water source.

14) **Page 5-10, Section 5.4.2.3.** What Region 9 screening table was used in this assessment? I think that the Region 9 1999 PRG values were updated for this report.....the beginning of the 2000 table lists the changes and these were incorporated here (e.g., the 2000 manganese value was used). The reference implies that the 1999 values were used through-out..

15) **Page 5-11, Section 5.4.2.4, Lead.** I do not agree that the detection of 695 ppm lead in a soil

sample in parcel F does not represent a site-related occurrence or a potential risk to a resident who may live at this location. In my comments of April 17, 2000 on Section 6.6.1, number 4, I stated "Because the soil lead concentration of 695 mg.kg is an estimate of the concentration in total soil, not the fine fraction that sticks to hands and is transported into the indoor environment, the risk estimate based on this value may well be an underestimate. The text seems to imply that this lead concentration does not present a concern, without any further discussion of the issue. Is there a risk to children from lead exposure? Where is this discussion?" I still do not see a discussion of *why* 695 mg/kg x 1.4 (the enrichment values implied by ACE) .....or approximately 1000 ppm of lead in soil ..... does not present a risk to a child residing on the parcel, or to a worker as well (adult screening level is 750 ppm, as per Adult Lead guidance). While I do not believe that this detection requires a full blown lead risk assessment, the potential for lead exposure should be discussed in the context of the EPA position and guidance on lead. Also if remedial action is planned for the CDA area, no further sampling would be required.....unless there is some evidence to suggest that the lead would not pass the leachability test for soluble lead.

It is also not clear why the value of 695 ppm has a "J" qualifier; the detection limit for lead in soil is usually about 50 ppm. And the lead is most certainly related to the debris in the CDA area; the deeper sample at this location also shows the presence of lead. Other shallow soils in the area also have lead hits, though again the fine fraction was not analyzed. The concern over lead in this waste was one of the primary reasons why EPA pursued sampling of the CDA soil in the first place.

16) **Page 5-15, Section 5.5.2.1, 2nd para.** Is it reasonable to assume that the CDA will have good vegetative cover? It is unlikely that this area will have grass, so this explanation does not sound very credible.

17) **Page 5-26, Section 5.6.1.5.** The age-adjusted water contact factor does not include the ET term. This differs for the showering adult and bathing child. Correct the equation, reported factor value and risk estimate. Hopefully, this is just a typo and the calculations are correct.

18) **Page 5-29, Section 5.6.1.6.** Same as above. The ET factor was omitted in the age-adjusted equation. Correct the equation and calculated values....and risk estimate?

19) All equation presentations should use consistent subscript notation.....eg., "child" vs "wc" or "sc", etc. This is confusing to the reader as presented.

20) **Page 5-30, Section 5.6.2.1.** a) The equation for the age-adjusted skin contact with ground water is given twice.....here and in Section 5.6.1.5. The second presentation of the equation is not needed; the description of the inputs is sufficient. One way to handle these discussions would be to label the equations and then refer to the equations used to derive the age-adjusted values described in this section; an alternate way is to refer to the section in which the age-adjusted equation is first presented.

21) **Page 5-31, Section 5.6.2.1.** Give the exposure time for the bathing child in the ground water contact discussion and any other pertinent comments.

22) **Page 5-31, Section 5.6.2.3. a)** What is the basis for the selection of 188 days/year for the construction activity? I did not see a discussion of the rationale for this choice. The values selected must not be arbitrary. b) Explain how the hourly respiratory rate was derived. Is these a reason for using an hourly rate rather than the worker default inhalation rate for an eight-hour work day? Usually the hourly rate is only used if an adjustment to the default is considered appropriate.

23) **Page 5-34, Section 5.8.3, general comment.** The estimated risks in this section should be consistently reported in the various sections and tables. It only confuses the reader when the reported values are shown as different estimates (eg, 2E-04 when total risk is 2.5E-04, and 2E-05 for surface soil when the risk is actually 2.6E-05). If two significant digits are to be reported for the carcinogenic risks (my preference), they should be consistently used. Also both the text description of risk and the numerical value should be reported for every risk. This whole section should be reviewed and corrected.

24) **Page 5-34, Section 5.8.3.1, 1st para.** The adult resident total risk shown in parentheses should be **2.5E-04**, not 2E-04.

25) **Page 5-34, Section 5.8.3.1, 4th para.** The reported total risk from soil exposure of 3E-05 does not match the two entries which follow (2E–05 from surface soil and 4E-06 from gardening); the Table 5-11 surface soil value is actually **2.6E-05.** Be consistent.

26) **Page 5-35, Section 5.8.3.2, 1st para.** EPA has previously commented that it is NOT appropriate to develop a non-carcinogenic risk estimate for a adult/child receptor by combining the ground water inhalation estimate for the adult with the remaining media estimates for a child. This cannot be a conservative estimate, as stated in the text, because the 12 minute shower to a 70 kg adult provides approximate half an order of magnitude less exposure than a 45 minute bath to a 15 kg child, especially when used with RfC values, which allow no adjustment for inhalation rate. However, in Table 5-8 and on page 5-31, 2nd para., it is suggested that the same inhalation rate (0.6 m3/hr) is used for both the showering adult and bathing child; the text also suggests that the total volatilization concentration is also the same. In both scenarios receptors are exposed to whole-house air concentrations from indoor water use. The non-carcinogenic child risk estimates are thus inappropriate as presented here and remain unacceptable to EPA . They must be corrected in all parcel evaluations.

27) **Page 5-35, Section 5.8.3.3.** The comments regarding consistent reporting also apply to the Parcel O risk estimates. Report two significant digits from tables consistently; do not round twice. In this section, both the total risk of 2.56 E-04 and the soil risk of 3.23E-05 are reported with a numerical value of 3! The gardening soil risk is reported to 2 significant digits, while the surface soil risk is reported to 1 significant digit.

28) **Page 5-36, Section 5.8.3.4.** Correct the ground water inhalation estimate as described above in comment # 26.

29) **Page 5-37, Section 5.8.3.5.** . Why was the 0-2 ft fraction used to represent exposure to surface soil? A statement about the uncertainty in assuming that the 0-2 ft soil concentration represents a normal child direct-contact depth, as well as in assuming soil concentrations in this parcel are similar to those on other residential lots is needed. The construction debris material is not homogeneous.

30) **Page 5-38, Section 5.8.3.6.** The comments regarding consistent reporting also apply to the Parcel N risk estimates. Report two significant digits from tables consistently

31) **Page 5-38, Section 5.8.3.7.** Correct the ground water inhalation estimate as described above.

32) **Page 5-38/39, Section 5.8.3.8.** The comments regarding consistent reporting also apply to

the Parcel P risk estimates. Report two significant digits from tables consistently. The values reported do not make sense.

33) **Page 5-39, Section 5.8.3.9.** Correct the ground water inhalation estimate as described above.

34) **Page 5-40, Section 5.8.3.10.** The comments regarding consistent reporting also apply to the Parcel S risk estimates. Report two significant digits from tables consistently.

35) **Page 5-41, Section 5.8.3.11.** Correct the ground water inhalation estimate as described above.

36) **Page 5-41/42, Section 5.8.3.12.** The comments regarding consistent reporting also apply to the Parcel F risk estimates. Report two significant digits from tables consistently.

37) **Page 5-42, Section 5.8.3.13.** Correct the ground water inhalation estimate as described above.

38) **Page 5-43, Section 5.8.3.14.** The comments regarding consistent reporting also apply to the Parcel D risk estimates. Report two significant digits from tables consistently. The numbers don't add up as reported.

39) **Page 5-44, Section 5.8.3.15.** Correct the ground water inhalation estimate as described above.

40) **Sections 5.8.3.16/5.8.3.17/5.8.3.18/5.8.3.19.** a) A clarification should be added to these discussions .....indicating that these well locations do not presently impact any current residents and were not used in the development of risk estimates for the residential Parcels. b) Report two significant digits from tables consistently. c) Correct the ground water inhalation HI estimate as described above.

41) **Sections 5.8.3.20/5.8.3.21.** a) Indicate in the text that this well pair was used for all current/future residential Parcel evaluations. b) Report two significant digits from tables consistently.

42) **Page 4-48, Section 5.8.3.21, Adult/Child Resident.** a) EPA NCEA does not support an RfD for benzene; thus the basis of the non-carcinogenic blood HI estimate is uncertain. Provide information on how this was derived. b) What is meant by "Similarly, antimony's mean concentration of 32 ug/L is also comparable to 2X the mean background concentration of 17.6 ug/L"? Why is this similar to thallium, for which a comparison of means is shown. Why is 2X the background concentration used for comparison for antimony?. c) Correct the ground water inhalation HI estimate as described above.

43) **Page 5-49, Section 5.10, 1st para.** Add that Parcel N is uncharacterized, as no soil samples were available.

44) **Page 5-49, Section 5.10, 2nd para.** This discussion is not complete and thus is not acceptable to EPA as a final conclusion. a) EPA does not separate out risks by individual media when determining the need for further action to protect human health and the environment. The total risk from

all media exposures should be derived to support the ROD decision. In addition, the soil risks ....some nearly 10-4 (Parcel S soil risk is reported as 10-4 in Section 5.8..3.10!)....heavily contribute to the total residential risk. EPA guidance does identify the individual residential unit as the appropriate risk unit for the land use scenarios evaluated here, and that is how the risk estimates should be reported. b) EPA does not use the risk range in the manner suggested here, and strongly discourages the use of such statements. EPA does have a point of departure for risk (10-6) and a risk range for total risk which is used to negotiate clean-up levels, primarily because it is not always possible to detect some contaminants at the 10-6 concentration level, much less cleanup some contaminants to this level. EPA also has a trigger risk level of 10-4; total site risks....not individual media or pathway risks.....may not exceed 10-4. This section MUST be rewritten. Some comments from EPA Headquarters have been provided in a separate attachment.

45) **Page 5-49, Section 5.10, 3rd para.** State that there is uncertainty in the soil lead hazard as samples were not sieved, and thus do not represent the exposure concentration of lead. The values likely provide an under-estimation of lead risk to children in Parcels....list those where lead was found and Parcel N (not-sampled).

46) **Page 5-49, Section 5.10, Addition.** Recap the comments from 5-7 (or maybe 6.0) in an additional section here, even though the indoor vapor migration pathway was not quantitatively assessed. Given the isopleth maps and these statements, it appears that soil vapor concentrations could contribute to risk to the residents in the Parcels evaluated. This area.....the CDA and the Parcels is the subject of this assessment, so the concentrations for this area shown in the isopleth maps must be described in this section in some form. Also, while the soil vapor maps are referred to in Section 3.1.3, page 3-5, this is early in the document; they should be referred to again here.

47) **Page 6-1, Section 6.0, 1st para.** Caveat the lead soil statement; the soil was not sieved.

48) **Page 6-1, Section 6.0, 2nd para.** See earlier comments about phthalates in landfills.

49) **Section 6.0.** See above comments about pathway or media risks, and include as appropriate in these bullets. In addition, add bullets that present the total (all chemical, all pathway) risk estimates for each residential Parcel and each identified receptor; this is the bottom-line of this assessment. Include uncertainty about the contribution of indoor vapor migration given the soil gas isopleths.

50) **General** Modify the comments about the "acceptable" risk range; this does not accurately reflect the EPA policy. Site actions can be taken to address risks at any level in the risk range; this is determined by the certainty (or uncertainty) in the data, the ability to cleanup to a more protective level, the cost, and a number of other factors. The 10-4 level is not a pre-determined decision point, as suggested in this document.

Tables

51) **Table 3-2.** The well location for the first entry is missing. What well is this.....101A?

52) **Table 5-7, Construction Worker .** a) The ED, EF and AT values for the Inhalation

pathway are not compatible. The AT suggests an exposure duration of three years, not 1 as shown. b) The EF (days/year) are not consistent between the three pathways or in the text discussions on pages 5-15 and 5-31. Hopefully the calculations are correct; they should be checked. c) It would help the reader if the sections where the text discussion of the selection choices are located were listed in reference b (eg. Section 5.6.2.3).

53) **Table 5-7, Age-adjusted values for Gardener and Resident.** The individual values used to derive the IFS_{adj} and SFS_{adj} are not readily available. Include these values in the footnotes.

54)) **Table 5-8, Age-adjusted values for Resident.** The entries include values for the individual parameters and the age-adjusted parameters. This is very confusing. For example, it may not be obvious to the reader that 30 years of exposure to a 70 kg adults was not used in the risk calculation. Fix the entries in the footnotes as described above.

55) **Table 5-x Table Addition.** It would be helpful to the reader if there was a Table showing which soil borings and which well pairs were used for each residential Parcel evaluation. The data does not appear to be arranged in a manner which allows the reader to see this easily.

56) **Table 5-12.** Where did the child gardener HI of 0.09 come from? The numbers don't add up.

57) **Table 5-16.** Where did the child gardener HI of 0.08 come from? The numbers don't add up.

58) **Tables 5-24/5-25/5-26.** How was the "blood" HI determined? EPA does not support an RfD for benzene

59) **Tables 5-25/5-26.** Note "d" is incorrect.

60) **Table 5-27, Exposure Assessment.** a) Add uncertainty in Parcel N due to derivation of soil concentrations in the un-sampled parcel and use of 0-2ft depth to represent direct contact pathways (ingestion and dermal).

61) **Table 5-27, Toxicity Assessment.** Add lack of child-specific toxicity values for the protection of children for most chemicals.

62) **Table 5-27, Chemical-Specific Uncertainties.** a) The last sentence presented for arsenic would appear to be an ACE bias; this is not the EPA position. b) The Stern ratio of 1.4 for lead in the fine fraction of soil is based on only 3 sites, and is not supported by the EPA Technical Review Workgroup for Lead. Site-specific data is preferred. See the *TRW Recommendations for Sampling and Analysis of Soil at Lead (Pb) Sites* on the TRW website at http://www.epa.gov/oerrpage/superfund/programs/lead/prods.htm. The actual ratio of lead in the fine vs total fractions of soil can vary widely; however, in general, there is an enrichment in the fine fraction.

63) **Table 5-27, Risk Characterization. a)** I do not agree with this statement, and I am not certain what data this is based upon. However, I would allow that the health effects at the higher exposure concentration may differ from those at the long-term, low-dose exposure. Ionizing radiation and benzene

are examples here. We're talking about non-threshold exposures and a potential life-time to develop the health effect, but many cancers develop within a shorter time frame (latency period) or even faster if some critical cumulative dose is exceeded (leukemia, mesothelioma). b) The major uncertainty here would seem to be from mixtures, which may change the toxicity and/or absorption of individual contaminants.....either synergism, or antagonism. EPA assumes simple additivity. c) EPA also assumes all chemical, all pathway additivity, which may overestimate both exposure and risk.

Figures:

64) **General.** There should be a figure that clearly shows the Parcel boundaries. Figure 2-1 is inadequate for determining parcel boundaries. Perhaps the parcel boundaries can be better defined on this map.